Moving Towards Sustainable Foods: Increasing Food Production on Grenfell Campus

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Abstract

Grenfell Campus is in a position of opportunity and responsibility to confront Newfoundland and Labrador's unsustainable food situation. Nearly all fresh food is brought onto the island by boat and by truck which can be delayed and diminish local food supplies. Food production on the island would lower the environmental impact while increasing food security. As an educational institution, Grenfell Campus has resources to find a way to produce food on an environmentally and economically sustainable level. Many universities have already addressed food sustainability with clear initiatives and progress reports, something Grenfell Campus currently lacks. Since Grenfell is a small campus of the greater Memorial University, it should take on small, low cost sustainability projects and build upon them, to gain support and interest. A large project can be dauntingly costly and require ongoing support for many years, which is difficult to maintain as universities have a high student turnover. Other universities have been successful in starting small and building on previous projects to increase their food sustainability status. This paper uses a literature search and primary data collection to provide a comparative analysis of the food sustainability status of Grenfell Campus and other Canadian and American universities. It also offers some potential routes to improving Grenfell's sustainability status.

Introduction

Food insecurity is an issue that many Newfoundlanders are familiar with. Food supplies must travel long distances and are sometimes delayed by road conditions or boats getting stuck in ice. Many small towns are far from full-service grocery stores and must rely on the limited variety and supplies of the local general store (Food First NL, 2015). Ninety percent of the fresh fruit and vegetables in Newfoundland and Labrador (NL) are imported from other places, and this supply is only expected to last two to three days (Food First NL, 2015). Although the province does produce its own chicken, eggs and dairy (mostly milk), these industries rely almost entirely on imported feed grains (Food First NL, 2015).

Memorial University, Grenfell Campus is located in Corner Brook, on the west coast of Newfoundland, and features several environment-focused degree programs. It is considered as the "green" campus of Memorial University, and was once home to the province's first industrial composter, which diverted the school's and some of the community's organic waste from landfills and turned it into nutrient rich compost (Grenfell Campus, 2015a). The decision to cut the composting program in 2016 was a disappointing one but was deemed necessary due to budget restrictions. The city of Corner Brook does not have its own composting program so the organic waste is going back into landfills (Bird, 2016). The campus's new residence complex, opened in 2013, is LEED Silver certified by the Canada Green Building Council (Newfoundland and Labrador Environmental Industry Association, n.d.), and the Arts and Science Extension was constructed according to LEED standards (Gill, 2012), but has not yet received certification.

Grenfell's Sustainability Committee was re-established in 2016 (Grenfell Campus, 2015b), but the sustainability coordinator for all of Memorial University's campuses is stationed in St. John's (Memorial University of Newfoundland, 2016). A food sustainability initiative for the campus would serve as a solution to Grenfell's dwindling green status, community education in sustainability, and food security at a local level.

University campuses are getting on board with sustainability issues across the country; by 2014, half of the Canadian accredited institutions have adopted sustainability policies, and half of these have even signed national or international sustainability commitments (CAUT, n.d.). A food sustainability initiative at Grenfell Campus would see more food coming in from local sources, either from the surrounding area or produced on the campus itself. Grenfell's student housing arrangements are designed to allow students to cook for themselves. This differs from many university campuses where students rely on dining halls to supply all of their meals. Making local food available to students could encourage sustainable food habits through practice; the most obvious way to go about this is to grow vegetables right on campus. This would ensure the food is as local as possible, while providing educational opportunities to anyone attending, visiting, or working at the campus. It would provide opportunities for students, staff and faculty to get involved with small-scale food production and make better use of the green spaces around the campus grounds. Plants have the potential to increase aesthetics both inside and out, and since Newfoundland has a relatively short growing season, taking advantage of the interior spaces is an alternative solution. There are many south-facing windows in the residences that receive periods of sunlight, and students could be brought together through the social aspect of gardening.

This paper will examine small-scale and campus food production methods to find one that might work for Grenfell and the surrounding community. These food initiatives could start small, from tiny indoor window gardens, and grow as resources and community interest become available. From there, the idea of lawn/garden renting will be explored as a possible option for an extension of the project if it outgrows the campus limits. All of these combined would see food security increase for the Corner Brook region, and Grenfell Campus could serve as an interpretation center and pilot project to spread this knowledge into surrounding communities and the rest of the province. Solving an issue like food security for an entire province is not going to happen with one big project. People need to see how small movements add up and that the whole process can be enjoyable and profitable for all.

Research Methods

Several research methods were used to gather relevant information for this project. A thorough literature review was conducted to determine what information already exists, and where the gaps in knowledge lie. I conducted an interview with an expert in botany and growing plants specifically on Grenfell campus. Two surveys were developed, one for the Corner Brook community and one for the Grenfell community to determine interest in vegetable gardening. The interview and survey questions were reviewed and approved by the program-level ethics review committee in March of 2017. Two simple maps (see Appendix A and B) were developed to identify some areas on Grenfell campus that are underused and have potential for growing crops. Sustainable food initiatives at other universities were also examined.

The literature review began with a background in sustainability as it relates to agriculture. It is largely known that industrial food production processes are environmentally unsustainable, so I looked deeper into sustainable food systems. Smaller scale operations are generally more environmentally sustainable, but are not as economically successful due to lack of economies of scale so my research turned to community gardens. I looked at community gardens for two reasons: one, for their ability to produce vegetables and two, for the social/societal benefits that come with them.

Since I wanted to focus this project around Grenfell campus, I researched the potential for food production on university campuses. I wanted to see whether universities have the power to influence change, and that this change can begin as small accomplishments. Alongside this, I researched the potential benefits and barriers of producing vegetables at schools. Most research that exists on the benefits of gardening is focused on children, but as some is focused on growing vegetables at schools, I saw an opportunity to relate it to my research.

I conducted an interview with emeritus professor in botany, avid gardener and horticulturalist, Dr. Henry Mann. Henry has been at Grenfell campus since it opened in 1975. He taught for 45 years in the biology department, specializing in botany and floral taxonomy, and taught a community course in hydroponics. Henry still conducts research at Grenfell Campus and is considered one of the top botanists in the province (R. Skinner, personal communication, April 4, 2017). He has successfully grown crops in the school for many years, including ten years of perfecting hydroponics conditions. Henry's expertise and knowledge made him the ideal candidate for an interview. He knows what resources exist at the school, and the time commitment required to produce a healthy crop indoors. He also gardens at home, in the same relative climate conditions as Grenfell, and was able to tell me of his successes and complications with growing vegetables outdoors. The interview questions can be found in Appendix C.

The survey for Grenfell campus was created to determine if people on campus would be willing to participate in a gardening project. Finding and maintaining a labour force is an issue for community and campus gardens. The maintenance of a vegetable garden is time consuming and it would not make sense to build one if there was no interest from the Grenfell community to help out. The survey was created through SurveyMonkey and distributed through Messenger, a daily email that is sent to everyone at Grenfell, and Facebook. The survey questions are in Appendix D.

The Corner Brook community survey was also created though SurveyMonkey and distributed through Facebook. I contacted the Corner Brook Public Library and the Rotary Arts Center to help distribute the survey, however I received no response from the library. This survey was designed to determine potential interest in a land-share program for vegetable gardening, if such a program were to be created. I gave a brief description of the land-share program as part of a Community Support Agriculture (CSA) project in Toronto, run by an organization called Cultivate Toronto. Their program requires a minimum of 500 square feet of sunny space and access to a garden hose. Volunteers maintain the vegetable gardens on average twice per week for the duration of the 18-week program (CultivateTO, n.d.). These survey questions are in Appendix E.

Many university campuses have developed some form of sustainable food plan or initiative (Dalhousie University, 2016; University of British Columbia, n.d.; University of New Brunswick,

2016; Yale University, 2017). I examined several of these plans from other universities that have succeeded in growing food on campus, to see what strategies might work for Grenfell campus, since access to local food sources is limited. Other aspects of these plans, reports or initiatives stood out as examples for what Grenfell could do to improve food sustainability. The size of the campus needs to be considered as Grenfell is small, and the growing season is short. A different model may have to be used for the interior and exterior spaces.

Literature Review

The Current State of Food Systems

Today's food production methods are dominated by large-scale food operations, justified by the need of reaching economies of scale which can increase profits. This approach to food production creates a relative abundance of food, but only of a few varieties, as monocrops are the norm; this type of farming also pollutes and depletes the environment to a greater degree than a smaller farm (Gliessman, 2015). The foods produced on these enormous farms then must travel long distances, as they are situated far away from cities and out of sight of the consumers, further contributing to climate change and decreasing the quality of the food product along the way.

Gliessman makes a strong argument that industrial agriculture is not sustainable: the tilling is intensive, leading to soil loss, monoculture fields lead to disease and nutrient depletion in the soil, synthetic fertilizers run off into waterways to cause devastating eutrophication, and irrigation methods are inefficient and are depleting water sources faster than they can be restored (2015). The chemicals that are used to control pests and weeds carried out of the fields by inefficient irrigation and rainfall to pollute water systems, just like the synthetic fertilizers (Gliessman, 2015). Gliessman's list ends with genetically modified organisms (GMO) which pose a threat to wild and domestic populations and create herbicide-resistant weeds, and confined animal feeding operations (CAFOs) (2015). CAFOs are incredibly intensive farms to raise livestock, and suffer from many of the same issues as plants do from being raised in a monoculture: more susceptible to disease, and reliant on chemical inputs to keep them healthy (Gliessman, 2015).

Sustainable Food Systems

Food brings the environmental, economic and socio-cultural dimensions of sustainability together (Blay-Palmer, 2010). The Food and Agriculture Organization of the United Nations (FAO) has proposed five principles of sustainable agriculture: 1) improved efficiency of resource use, 2) "direct action to conserve, protect and enhance natural resources", 3) protection and improvement of rural livelihoods and social well-being, 4) enhances resilience of people, communities and ecosystems, and 5) it requires "responsible and effective governance mechanisms" (2014). Environmental sustainability can be practiced in the production and distribution of food: ecologically sensitive farmers recognize the need for biodiversity in addition to health food and soil to maintain and protect ecosystems. Buying local food reduces food miles and therefore environmental impacts, and strengthens local economies by giving money back to local farmers and distributors (Blay-Palmer, 2010).

A sustainable food production system is one able to preserve the ecological conditions necessary for food production and consumption in the future; one that is focused on producing quality food

within the ecosystem limits, not on increasing crops and profits (G. Sabau, personal communication, March 13, 2017). It is more environmentally sustainable to have many small- to medium-scale food production operations than the industrial- sized ones dominating the food of today. Farm size is generally classified by income, rather than acreage. According to the United States Department of Agriculture (USDA), small (or low-sale) family farms are those that gross less than $100,000; the median size of these farms (in the United States) was 145 acres in 2007, and farms considered as 'limited-resource' were about half as large on average (Hoppe, Korb, O'Donoghue & Banker, 2007). These smaller, more local operations have many environmental and social benefits: the food is fresher, the impacts are smaller and the consumers become more connected with the foods they are eating and where they come from (Duram, 2010, as cited in Duram & Williams, 2015, p. 4). Despite these social and environmental benefits, it can be difficult to maintain profits compared to a larger farm due to economies of scale – a larger output means a lower cost-per-unit to the producer (Investopedia, 2017).

The current economic system is focused around continual growth even though we live in a world of finite resources; the opposite of growth being recession, we appear to be stuck between the deterioration of either living or environmental resource conditions (Bloemmen, Bobulescu, Le & Vitari, 2015). The concept of degrowth became popular in the research of the 2000s (Bloemmen, et al., 2015) mostly in Europe. According to Serge Latouche, a society of degrowth is "built on quality rather than on quantity, on cooperation rather than on competition" (Latouche, 2003, as cited in Martinez-Alier, Pascual, Vivien & Zacci, 2010, p.1742). Community supported agriculture (CSA) is an example of economic degrowth, where consumers pay up front for a share of the produce grown in that season (Bloemmen, et al., 2015). There are many ways to run CSAs, but the basic principle is for consumers to invest in the farm to offset the farmer's operation costs. This agricultural practice ultimately results in the consumer sharing the production risk with the farmer (Bloemmen, et al., 2015).

As the population of cities increases, nearby farmland is abandoned and transformed by urban sprawl (Russel, 2006). A community supported agriculture (CSA) program can utilize urban space for growing food crops though a collection of small, productive areas. This concept of share-cropping, which involves landowners donating their lawns and a sum of money to the CSA so their people can work the land (CultivateTO, n.d.), helps to solve the issue of disappearing farmland due to urban sprawl, and the issue of access to fresh food.

Community Gardens

Gardens are considered peaceful and restorative environments, and can serve as places to relieve stress (Scoggins, 2010). Community gardens in America began during the Great Depression of the 1930s to supplement household food supplies as employment rates decreased. There are different ways to manage community gardens, although they often exist as a collection of rental plots for individuals to tend to, with the overall management being shared (Lawson, 2005). Participation in community gardens has the potential to change the way people think about food, environment and health by giving them an alternative experience to the way we produce and access food today (Hale, et al., 2011). Community gardens can revitalize the aesthetic of neglected neighbourhoods while encouraging community participation (Lawson, 2005). Many gardeners in the study by Hale, et. al (2011) contrasted the clean, cool air of the garden environment to the noisy, hot and

polluted surrounding city. The aesthetic experience of the gardens attracted people to learn about all its processes – from composting to harvesting – and how they interact (Hale, et al., 2011).

Community gardens foster opportunities for adults to learn about environmental sustainability, food security, social justice and cultural identity in an informal setting (Walter, 2013). A study in California showed that backyard gardens led to a higher quality of life: vegetable consumption and time spent with family increased due to the home gardens, and provided an opportunity to get closer to neighbours. The community members responded positively to the home-gardening programme and graduated participants began recruiting their neighbours into the programme (Gray, Guzman, Glowa & Drevno, 2014).

Influential Power of Universities

Universities hold the power to demonstrate and experiment with sustainable practices and influence their students to make sustainable decisions in the future (Edwards, 2012). Campus sustainability is not a result of a paradigm shift, and it begins with an accumulation of small sustainability projects that may eventually influence policy change (Duram & Williams, 2013). At Unity College, food culture changed by emphasizing food awareness, but they kept some industrial food distributers and continued to offer pizza and French fries at the cafeteria. This allowed students to accept the change in a positive manner rather than reject it because it was forced upon them (Thomashow, 2014). Barlett (2011) argues that campus food initiatives can inflict significant economic and political impacts on the agri-food system, in addition to providing public education and benefits to the campus. Organizational change for sustainability at California State University, Northridge, is driven by community outreach, communication, leader's core values and incentives, and faces barriers such as lack of funding, information, time and training, conflict between shared values and issues with policy (Kurland, 2011).

School Gardens

The development of a student-run garden or campus farm shows the institution is committing to sustainability (Sayre, 2011) but there are barriers in the initial stages that require a driven group of individuals to overcome (Duram & Williams, 2013). Logistical barriers such as getting permission and choosing a location are present before the garden exists (Duram & Williams, 2013), and maintaining labour and funds persist throughout the lifespan (Bell, 2013, as cited in Ridgeway & Matthews, 2015). Community supported agriculture (CSA) has allowed student farms to be financially self-sufficient, through the guaranteed income from annual membership fees (Sayre, 2011).

A study at Brescia University College, a small campus of Western University, found that food production was not a top priority for having a garden on campus. Survey respondents noted that the garden could serve as an educational opportunity and a place to relax, but keeping up with maintenance would be a concern (Ridegeway & Matthews, 2015). McGill University's Edible Campus project was designed around four key characteristics that would show how vegetation in design can rapidly transform urban spaces, and at low-cost: modularity, mobility, seasonality and scalability as a "do-it-yourself" project (Bhatt, Farah, Luka & Wolfe, 2009). This project made use of modified container gardens that could be easily moved, and the scale could be altered by the

number of containers used. Visitors to the campus would be able to see the productivity of one container, its minimal size and maintenance, and decide that they could do the same at home.

Youth gardens in elementary schools and childcare centers are possible even with limited resources, and provide hands-on opportunities for children to learn about how fruits and vegetables are grown (Wright, Friese, Carrel & Meinen, 2013). Childhood involvement in gardening is associated with increased fruit and vegetable consumption during childhood and onward into early adulthood, particularly when gardening practices are continued (Loso, et al., 2016).

Food Security in Newfoundland

Supplementary farming has deep roots in Newfoundland and Labrador's history. Although commercial farming struggled economically early on, it was common for fishing families in out port communities to grow root vegetables and some livestock for their own use. Supplementary farming was discouraged by the provincial government in the 1950's, favouring the productivity of larger commercial farms (Cadigan, 1998). Food security these days in rural areas of Newfoundland and Labrador or NL is a serious issue due to the long distances food must travel to get there (Food First NL, 2015). Farmland in Newfoundland and Labrador is limited, and the barriers for new farmers wishing to start up are difficult to overcome (Food First NL. 2015). February 2017 brought about a provincial government announcement to transform 64,000 hectares of Crown land for the purpose of agriculture. This land will be spread out over 62 different agricultural areas in the province (CBC News, 2017). There are currently three CSAs in Newfoundland and Labrador, all located on the east coast of the island (Food First NL, n.d.). The newly available land could provide an opportunity for CSA expansion, with the potential for Grenfell to take advantage of some of this land.

Sustainability Status of Grenfell Campus

Grenfell's strategic plan for 2015-2020 states in goal 4.4 to "significantly advance Grenfell's position as an environmentally sustainable campus" (Grenfell Campus, n.d., p. 33). The industrial composter diverted over 44 tons of organic waste from landfills to be used on the campus gardens and lawns (Grenfell Campus, 2015a). Composting makes up part of a sustainable food system because food wastes are being converted into something that is beneficial to plant growth. Compost is a good source of natural fertilizer for vegetable gardens, but must be deemed safe to use first as toxins can be taken up by the plants. The Boreal Ecosystem Research Initiative at Grenfell Campus has laboratories and professors focused on soil analysis (Grenfell Campus, 2015c)

The Grove, the companies serving meals to people in the dining hall, has a commitment to sustainability in response to Grenfell's sustainability vision. This commitment states "sourcing food and supplies locally where possible" and using materials that could be composted in Grenfell's composter, which is no longer operating (The Grove, n.d.). There are no figures posted to estimate how much food really does come from local sources. This sustainability statement does not hold the Grove to any standard, or show measurable improvement without figures.

The student residences on Grenfell campus are set up differently than in most universities. All students on campus have access to a shared cooking facility and a fridge, meaning many students

do not rely on the dining hall for meals. In the chalet apartments, a small kitchen and full sized fridge/freezer is shared between four people. The other residences, Arts & Science (A&S) and Residence Complex (RC), have larger kitchen areas with multiple stoves, microwaves and deep freezers that are shared by 20-30 students, and around 50 students respectively. The students share a fridge/freezer with only their roommate. The closest grocery store, Coleman's, provides a free shuttle for students on campus to the grocery store and back twice a week.

'Farmer's Feast' is student-volunteer operated and organized by the Environmental Affairs Committee (EAC). This group prepares meals with as many local ingredients as possible and serves them to students for free. This activity is a chance to educate students about sustainability and the importance of local foods. Students wishing to try the meal are encouraged to bring their own bowls to reduce waste. This is also a great opportunity for students to learn how to cook; sometimes many volunteers with a range of cooking experience help prepare the meals and those who have little experience can be tasked with peeling/chopping vegetables while watching more experienced volunteers bring the meal together. Farmer's Feast aims to get together once a month, but dwindling numbers in the EAC have reduced this to once or twice per semester over the last year. In 2014, the Farmer's Feast group was serving meals to the community on a biweekly basis (Keeling, 2014).

Grenfell Campus has a community garden made of raised garden bed plots. Constructed in 2011 by high school students attending the Canadian Student Leadership Conference, and staff, faculty and student volunteers, the garden started with 10 plots (Grenfell Garden Progress Report, 2013). In 2012, the plot rental fee was $24.00 and some plots were shared by more than one user; 4 users were Grenfell faculty, 11 were Grenfell staff and 10 were Grenfell students (Grenfell Garden Progress Report, 2013). The lumber to construct the initial garden beds cost $1924.58, but in kind donations and grants helped to offset this cost. The plots rentals generated $216 in revenues (Grenfell Garden Progress Report, 2013). The garden has since been relocated due to the placement of a monument in its original location. The garden is now located behind the Forestry building and greenhouse. This area would have to be assessed to determine if there is room for expansion.

Grenfell Campus has a webpage listing all ongoing sustainability activities on campus, but does not elaborate on any points, or offer links to more information (Grenfell Campus, 2015b). This webpage appears to be up to date and maintained by Marketing, Communications and Advancement at Grenfell, although it is unclear how often it is updated. Many universities seeking to improve their sustainability status have published a comprehensive report that attractively and effectively displays their current sustainability status. The University of British Columbia (UBC) has a Campus Sustainable Food Guide (n.d.), the University of New Brunswick (UNB) recently released "The Green Review" (2016), and Dalhousie University has several publications on sustainability actions on campus, including the "Sustainable and Healthy Food Framework" (2016); these publications are a few examples out of many. A complete report on the sustainability of Grenfell Campus would be a good initiative to spread sustainability awareness and identify areas that can be improved.

Sustainable Food Initiatives at Other Universities

The Sustainable Endowments Institute is a nonprofit group dedicated to advance campus sustainability operations and practices through research and education. This group published the College Sustainability Report Card between 2007 and 2011, which independently evaluates colleges and universities with the highest endowments in Canada and the United States for their sustainability policies and practices (Sustainable Endowments Institute, 2011). The College Sustainability Report Card found that 70% of over 300 of these schools had either a community garden or farm on campus in 2011; this is an increase of over 30% from only two years previous (Sustainable Endowments Institute, 2011). The information in this report card appears to show that sustainable food systems are becoming a trend in post-secondary environments.

The University of British Columbia (UBC) published a Campus Sustainable Food Guide, a colourful 35-page document to raise awareness about sustainable food system activities on campus. This guide outlines all sustainable activities on campus associated with food, from the labelling system in food vendors on campus to signify local (L), organic (O), or vegan (V) to the farm and garden projects run through the university. The guide also includes a "Food Rules" section informing readers of seven simple ways they can make a difference for the environment and the food system: use reusable containers, compost organics, eat less packaged food, eat vegetables that are in season, buy local, buy fair trade if you can't buy local, and finally get involved with the food system (UBC, n.d.). All sustainable food vendors on campus are listed in this guide, along with whether they are local, offer dishware, have composting available, or offer a discount for bringing a reusable container.

Dalhousie University introduced tray-less dining in their cafeteria, and purchased around 40% of their food from local sources by 2013, depending on the seasonal availability. A Farm-to-Table program is in place for farmers to interact directly with students about the products served in the cafeteria. There is a student community garden on campus and students, staff and faculty have access to the nearby Common Roots Urban Farm to grow food. Students and community members work together in the 'Loaded Ladle' cooperative to serve healthy food and educate the public about environmental politics and food. This cooperative is funded by a small fee included in students' tuition (Dalhousie University, n.d.). Dalhousie's "Sustainable and Healthy Food Framework" includes well defined purchasing, preparation, operation and end use goals (2016). These goals are laid out in a table that includes the actions that will be taken to meet the goal, what progress has been made so far and generalized targets that include vague words such as "increase", "reduce" and "support", but they also include figure-based measurement targets for the next report in 2018 (Dalhousie University, 2016).

The University of New Brunswick (UNB) placed four planters with a variety of vegetables growing in high traffic areas of their Fredericton campus (UNB, 2016). These planters are offering free, fresh produce to students since their installation in the summer of 2016. In addition to free food, these planters serve as a conversation piece to engage the community in issues of food sustainability and security (UNB, 2016). The Fredericton campus attracts about 8300 students to study every year (UNB, n.d.). The smaller Saint John campus brings in 2550 students each year (UNB, n.d.) and had the grand opening of their community garden in 2014 (UNB, 2016). The plot rental fees are $10 for students and $20 for staff/faculty. This cost covers the space, tools and soil,

leaving seeds as the only other responsibility to the gardener (UNB Saint John Campus and Community Garden, 2016). There was also an Intro to gardening workshop offered a week after the 2016 opening, to offer gardening tips to both beginner and experienced gardeners (UNB Saint John Campus and Community Garden, 2016). The plots are on the ground but are clearly separated by mulch walkways. I see this approach as more cost effective than the raised garden beds on Grenfell campus because they require less built-up soil and there are no costs for lumber.

Yale University's Yale Sustainable Food Program (YSFP) was initiated by an Environmental health and policy course taught in 2000. The course inspired students to meet with Yale's dining services about the possibility of offering more organic foods in the dining halls, which led to changing conventional food items to organically sourced ones, where there was no increase in cost. These students formed an organization called "Food From the Earth", which supported the organic food in dining halls, but also held meetings, wrote petitions and brought a conference together called "Farming and Eating in New England" in 2002. In 2003, construction of the campus farm began alongside a pilot composting program to recycle food waste. YSFP has grown to employ student farm managers and interns for programs and events. It has also influenced course offerings and programs to focus on food and agriculture. The program aims to increase food and agriculture education at Yale, bringing together the faculty to offer more courses on this topic (Yale University, 2017).

Benefits of Gardens on Grenfell Campus

Goal 3.2 in Grenfell Campus' *Vision 20/20* is to "continue to expand and develop physical environments that increase satisfaction" (Grenfell Campus, n.d., p. 29). As gardens are considered peaceful environments that encourage social interaction, Grenfell could meet this goal by incorporating more vegetation on campus. There are planters throughout the buildings and outdoors with decorative vegetation, and there may be space for more. There is a greenhouse on campus, located near the Forestry Center and the community garden which could be used to start seedlings before transferring them to more noticeable locations. The Forestry Center has indoor balcony gardens on the third and fourth floors, and outdoor planters on the balcony outdoors on the third floor; all of these planters are currently hosting decorative plants. Several concrete flower planters are located near the entrances of buildings, and could easily incorporate edible plants once the weather is warm enough. The inclusion of edible plants would encourage passersby to think about food, where it comes from, and how easy it can be to produce it even in the harsh climate of Newfoundland.

Vegetable growing on campus, even on a small scale, could help to achieve goal 4.4 to "significantly advance Grenfell's position as an environmentally sustainable campus" (Grenfell Campus, n.d., p.33). While a few vegetable planters may not be significant, it could get the ball rolling for other small sustainability activities. Eventually, these small actions could add up to either a cumulative significant impact, or influence a larger project or commitment to sustainability that would qualify to achieve this goal.

Feasibility of Food Production on Grenfell Campus

Grenfell Campus has ample space to grow vegetables both indoors and outside on the campus grounds. There are many underused grassy areas that are subject to regular maintenance in the months without snow. The greatest barrier to outdoor crop production is the short growing season in Newfoundland. Frost risk may persist into June, which means gardeners need to monitor conditions and be prepared to cover crops if frost is predicted. A shorter growing season also means fewer harvests, especially for longer growing crops (H. Mann, personal communication, March 16, 2017). Another barrier is the availability of labour to maintain the crops. There are very few students on campus during Newfoundland's growing season, as the Winter semester ends in April and the Fall semester does not begin until Fall; these are the semesters with the highest enrollment as the majority of courses are offered during this time. Since the growing season does not coincide with student presence, an outdoor garden might not get used as an educational tool, unless summer or intersession courses touched on some aspects of a garden. Grenfell does offer an outdoor-learning based course, Outdoor Pursuits (Memorial University of Newfoundland, 2017), that could be modified to focus around food growing and security issues. If offered during intercession or the summer semester, this course could help with maintenance of a campus garden.

Indoor growing might be a solution to dealing with Newfoundland's short growing season, but there are issues with this as well. Indoor crop production requires at least sixteen hours of daily sunlight to reap the benefits in a timely manner (H. Mann, personal communication, March 16, 2017). Unfortunately, even protected from the elements, a south-facing, sunny window cannot provide this much sunlight during the winter months. Furthermore, growing crops on windowsills will result in spindly, weak stalks as the plants reach towards the faraway light source (H. Mann, personal communication, March 16, 2017). Greens such as lettuce and chard can be grown and harvested in approximately six weeks under fluorescent lights in either a hydroponic solution, or a soil mixture. Greens are the easiest crop to grow indoors because they do not require pollination. Greens will grow in low light conditions, but produce more lush vegetation and faster if the lights are kept about four to five centimeters away from the plant, raising the lights to maintain this distance as they grow (H. Mann, personal communication, March 16, 2017). Henry suggested that funding could be acquired with a good proposal and persistence to start vertical gardens with fluorescent lights . The plants in a vertical garden could be grown either in soil or in hydroponic solution, with little cost to maintain them after the initial set up (H. Mann, personal communication, March 16, 2017). A small vertical garden project could serve the same purpose as the free food planters on the University of New Brunswick campus, and could produce food indoors year round.

Survey Results

The survey for the campus community brought in 64 responses, 33 being students living on campus, 20 living off campus, 8 staff/faculty and 2 visitors. One respondent chose to skip the first question. Just over half of the respondents selected freshness as the most important factor in buying produce, and about one quarter selected affordability. Nobody selected 'No' to the question about wanting to see more vegetables grown on campus, although 7 people said they were indifferent. 53 respondents answered that they would like to learn more about growing vegetables, and the

most popular garden type was indoor window gardens. Only 9 respondents said they have no time to help out with a garden, while many would contribute at least an hour per week.

The community survey failed to turn up many responses, however this was not the main objective of the project. For future development of a similar project, a community survey would need to be distributed in a more effective manner. Paper surveys could include an older generation that may not yet be familiar with the use of a computer, and those who do not have regular access to one. It was difficult to convey the idea of a land-share program without being overwhelming and deter respondents. A community survey like this one may not be the best way to collect information on community interest. A focus group approach may be more effective because the groups can be educated and ask questions about the program before they decide whether they want to participate. I also believe it was too early to propose this idea to the community; it was too hypothetical and needs a more solidified plan of the project and how it would run in this area.

Discussion

The goal of this project was to determine if there is interest in gardening on Grenfell campus, and if it is feasible to grow crops. The survey for Grenfell campus shows interest in learning about gardening on campus, and many respondents said they would dedicate time to tending a vegetable garden. The long winter months of Newfoundland make it difficult to start a garden project when most class activity is from September to April; this is when the campus is most populated. Indoor gardening requires more light than what the sun can provide and would be costly to start up (initial supplies) for a food production scale. There are other benefits to vegetable gardens aside from the food that can be harvested from them though. There is wealth in the knowledge that can be learned from a garden, even on a small scale. Opportunities for socializing and de-stressing can also be provided by a vegetable garden, especially if seating areas are planned near the gardens.

Although my interview with Dr. Henry Mann led me towards the use of artificial lights to produce healthy crops, there are many resources that argue window gardening is possible and productive. This method may be slower to bring a harvest, but it remains low-cost, and could be carried out by interested students in the residences, and many areas of the school buildings, if permitted. Much like the free food planters at the University of New Brunswick, a start-up project to get people involved might not be overly productive at first, but it can pave the way for future, larger projects.

Grenfell is a fairly small campus compared to most universities. A project as big as a campus farm needs a dedicated person to organize it – a sustainability coordinator, for example. A sustainability coordinator should be responsible for overseeing all sustainability activities on Grenfell Campus, facilitating communication between students and the current Grenfell Sustainability Committee, and displaying Grenfell's sustainability achievements and goals in an attractive and accessible manner. Grenfell would benefit from starting small and inspiring minds to make little changes towards sustainability. The free food planters at the University of New Brunswick might be a way to start a conversation in food security and sustainability, as it does not require many resources to establish. A sustainability coordinator would be able to acquire resources and present projects in such a way to gain attention of not only students, but of visitors to the campus as well. The development of a strategic food or sustainability plan is also needed, with baseline measures and

the desired improvements clearly stated. A strategic sustainable food plan could also be organized by a sustainability coordinator.

Conclusion

Food security and sustainability are issues that affect much of Newfoundland and Labrador. Grenfell campus has a responsibility as a university campus to address sustainability issues and lead community members to participate in the search for solutions. Although Grenfell campus is small compared to other universities, it still has financial, educational and potential labour resources to develop a plan for change. In growing vegetables on campus, students are exposed to the processes of small scale food production, and may bring this knowledge and practice with them throughout their life time. A sustainable food initiative at Grenfell campus may start very small; the idea of free food planters such as the one at UNB Saint John could be a feasible option to begin with, as it is relatively low cost and low maintenance. These planters could be used to promote food awareness and direct interested students, staff or community members to participate in the community garden, with potential to expand.

The beginnings of a movement could attract interested students to get involved and either expand on an existing project, or address a new issue. Grenfell needs a true commitment to sustainability; one that is more tangible than 'significantly improving' its current status. Universities are committing to sustainability in as many ways as they can, attracting new students to become involved. With the loss of the composter, Grenfell needs a sustainability coordinator to organize a campus garden among other projects, which will in turn attract prospective students interested in sustainability. In my opinion, is the most important and perhaps the easiest project to start improving sustainability on Grenfell Campus is to develop a sustainability report. Other university campuses that I looked at published the smallest accomplishments in sustainability; these small accomplishments accumulate into something worth mentioning, and can serve as a baseline for improvement.

References

Barlett, P. F. (2011). Campus sustainable food projects : Critique and engagement. *American Anthropologist, 113(1),* 101-115. Doi : 10.1111/j.1548-1433.2010.01309.x

Berg, D., Ciotobaru, S., Mallari, M., & Pirri, M. (n.d.). *On-campus food systems: Production, distribution & best practices.* Retrieved from http://www.farmtocafeteriacanada.ca/wp-content/uploads/2014/11/PGI-On-Campus-Food-Systems-copy.pdf

Bhatt, V., Farah, L. M., Luka, N., & Wolfe, J.M. (2009). Making the edible campus: A model for food-secure urban revitalisation. *Open House International, 34(2),* 81-90.

Bird, L. (2016, August 12). Composter at Grenfell Campus closing due to budget cuts. *CBC News.* Retrieved from http://www.cbc.ca/news/canada/newfoundland-labrador/grenfell-campus-composter-closing-due-to-budget-cuts-1.3718057

Blay-Palmer, A. (2010). *Imagining sustainable food systems: Theory and practice*. Burlington, VT: Ashgate.

Bloemmen, M., Bobulescu, R., Le, N. T., & Vitari, C. (2015). Microeconomic degrowth: The case of community supported agriculture. *Ecological Economics, 112,* 110-115. Doi: 10.1016/j.ecolecon.2015.02.013

CBC News. (2017, February 20). Grow you own: How N.L. plans to produce more of its own food. *CBC News.* Retrieved from http://www.cbc.ca/news/canada/newfoundland-labrador/crown-land-farming-food-security-young-farmers-1.3990939

Cadigan, S. (1998). *Agriculture.* Retrieved from http://www.heritage.nf.ca/articles/economy/agriculture.php

CAUT. (n.d.). *Sustainability movement grows across Canadian campuses.* Retrieved from https://www.cautbulletin.ca/en_article.asp?ArticleID=4117

CultivateTO. (n.d.). *Share your yard.* Retrieved from http://cultivatetoronto.com/join-the-harvest/share-your-yard/

Dalhousie University. (n.d.). *Sustainability Progress Report for Campus Operations 2010-2013.* Retrieved from https://www.dal.ca/content/dam/dalhousie/pdf/dept/sustainability/Sustainability%20Progress%20Report%202014-1.pdf

Dalhousie University. (2016). *Sustainable and Healthy Food Framework.* Retrieved from https://www.dal.ca/content/dam/dalhousie/pdf/dept/sustainability/Sustainability%20Health%20Food%20Report%202016%20Final%20Report%20(1).pdf

Duram, L. A. & Williams, L. L. (2015). Growing a student organic garden within the context of university sustainability initiatives. *International Journal of Sustainability in Higher Education, 16(1),* 3-15. Doi: 10.1108/IJSHE-03-2013-0026

Edwards, K. E. (2012). Moving beyond green: Sustainable development toward healthy environments, social justice, and strong economies. *New Directions for Student Services, 2012*(137), 19-28

FAO. (2014). *Building a common vision for sustainable food and agriculture: Principles and approaches.* Retrieved from http://www.fao.org/3/a-i3940e.pdf

Food First NL. (November 2015). *Everybody Eats: A discussion paper on food security in Newfoundland and Labrador.* Retrieved from http://www.foodfirstnl.ca/our-projects/everybody-eats

Food First NL. (n.d.). *Who's your farmer?* Retrieved from http://www.foodfirstnl.ca/rcr-archive/2010/04/whos-your-farmer?rq=csa

Food First NL. (n.d.) *2015-2016 Annual Report.* Retrieved from http://www.foodfirstnl.ca/our-resources/2016-annual-report

Gill, P. (2012, June 6). Academic extension officially opened at Grenfell Campus. *The Gazette.* Retrieved from http://www.mun.ca/gazette/issues/vol44no15/grenfell.php

Gliessman, S. R. (2015). *Agroecology: The ecology of sustainable food systems* (3rd ed.). Boca Raton, FL: Taylor & Francis Group

Gray, L., Guzman, P., Glowa, K. M., & Drevno, A. G. (2014). Can home gardens scale up into movements for social change? The role of home gardens in providing food security and community change in San Jose, California. *Local Environment, 19(2),* 187-203. Doi: 10.1080/13549839.2013.792048

Grenfell Campus. (2015a). *Grenfell composter.* Retrieved from http://www.grenfell.mun.ca/Faculty-and-Staff/Pages/Facilities-Management/Grenfell-Compost.aspx

Grenfell Campus. (2015b). *Ongoing Sustainability Activities.* Retrieved from http://www.grenfell.mun.ca/campus-services/Pages/sustainability-activities.aspx

Grenfell Campus. (2015c). *Boreal Ecosystem Research Initiative.* Retrieved from http://www.grenfell.mun.ca/campus-services/Pages/campuses/boreal-ecosystem-research-initiative.aspx

Grenfell Campus. (n.d.). *Vision 20/20 strategic plan 2015-2020.*

Grenfell Garden Progress Report. (2013). *Grenfell Garden Progress Report.*

Hale, J., Knapp, C., Bardwell, L., Buchenau, M., Marshall, J., Sancar, F., & Litt, J. S. (2011). Connecting food environments and health through the relational nature of aesthetics: Gaining insight through the community gardening experience. *Social Science & Medicine, 72(11),* 1853-1863. Doi: 10.1016/j.socscimed.2011.03.044

Hoppe, R.A., Korb, P., O'Donoghue, E.J. & Banker, D.E. (2007). *Structure and Finances of U.S. Farms: Family Farm Report, 2007 Edition.* Retrieved from www.ers.usda.gov/webdocs/publications/eib24/11876_eib24_1_.pdf

Investopedia. (2017). *Economies of Scale.* Retrieved from http://www.investopedia.com/terms/e/economiesofscale.asp

Keeling, G. (2014, May). *Green Revolving Funds and the Path to Sustainability for Grenfell Campus, Memorial University of Newfoundland* (EVST 4950 – Independent Research Project). Grenfell Campus, Memorial University of Newfoundland, Corner Brook, NL.

Kurland, N. B. (2011). Evolution of a campus sustainability network: A case study in organizational change. *International Journal of Sustainability in Higher Education, 12(4),* 395-429. Doi: 10.1108/14676371111168304

Lawson, L. (2005). *City bountiful: A century of community gardening in America*. Berkeley: University of California Press.

Loso, J., Staub, D., Colby, S., Zhou, W., Olfert, W., Kattelmann, K.,…Mathews, A. (2016). Childhood and current gardening is associated with increased fruit and vegetable intake among college-aged students participating in the Get Fruved study. *Journal of the Academy of Nutrition and Dietetics, (116, 9),* A13. Doi: 10.1016/j.jand.2016.06.029

Martinez-Alier, J., Pascual, U., Vivien, F., & Zaccani, E. (2010). Sustainable degrowth: Mapping the context, criticisms and future prospects of an emergent paradigm. *Ecological Economics, 69,* 1741-1747. Doi: 10.1016/j.ecolecon.2010.04.017

Memorial University of Newfoundland. (2016). *Sustainability Office*. Retrieved from http://www.mun.ca/sustain/office.php

Memorial University of Newfoundland. (2017). *13.13 Environmental Studies.* Retrieved from http://www.mun.ca/regoff/calendar/sectionNo=SWGC-0859

Newfoundland and Labrador Environmental Industry Association. (n.d.). *Memorial University: Grenfell Campus residences receive LEED Silver certification.* Retrieved from http://neia.org/memorial-university-grenfell-campus-residences-receive-leed-silver-certification/

Ridgeway N. & Matthews, J. (2015). Campus gardens: Food production or sense of place? *Canadian Food Studies, 2(1),* 99-118. Doi: 10.15353/cfs-rcea.v2i1.23

Russell, A. (2006). Urban sprawl: A growing concern for agriculture. *Journal of Natural Resources and Life Sciences Education, 35,* 152-154. Retrieved from https://search.proquest.com/docview/194484330?accountid=12378

Sayre, L. B. (2011). *Fields of learning: The student farm movement in North America*. Lexington, Ky: The University Press of Kentucky.

Scoggins, H. L. (2010). University garden stakeholders: Student, industry, and community connections. *HortTechnology, 20(3),* 528-529

Sustainable Endowments Institute. (2011). *The College Sustainability Report Card*. Retrieved from http://www.greenreportcard.org/index.html

The Grove. (n.d.). *The Grove.* Retrieved from http://www.campusgrove.ca/

Thomashow, M. (2014). *The nine elements of a sustainable campus*. Cambridge, MA: MIT Press.

UNB Saint John Campus and Community Garden. (2016). In *Facebook* [Group page]. Retrieved from https://www.facebook.com/unbsjgarden/

UNB (University of New Brunswick). (2016). *The Green Review*. Retrieved from http://www.unb.ca/advancement/marketing/brand-inspiration/the-green-review.html

UNB (University of New Brunswick). (n.d.). *Campuses*. Retrieved from http://www.unb.ca/international/prospective/campuses.html

University of British Columbia. (n.d.). *UBC Sustainable Campus Food Guide.* Retrieved from https://sustain.ubc.ca/sites/sustain.ubc.ca/files/images/UBCSustainableCampusFoodGuide.pdf

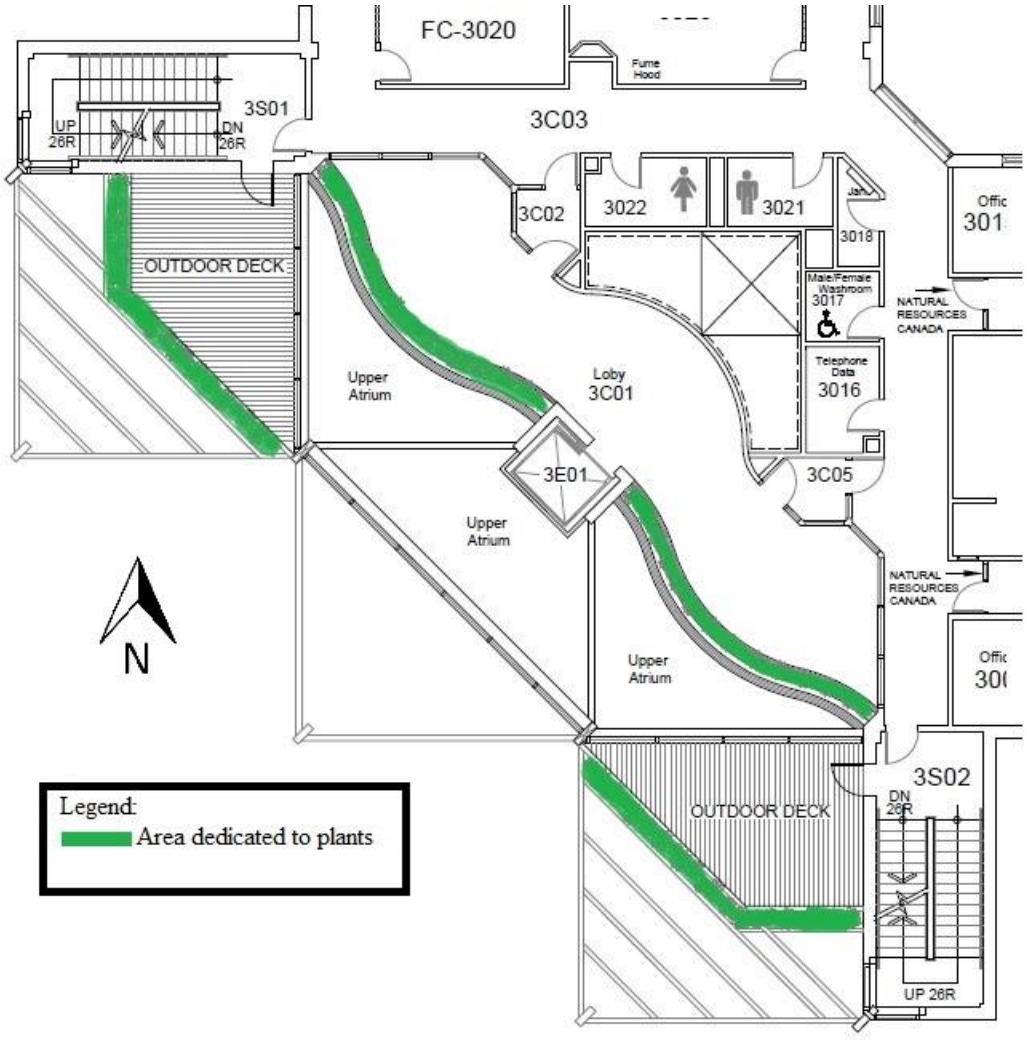
Walter, P. (2013). Theorising community gardens as pedagogical sites in the food movement. *Environmental Education Research, 19(4),* 521-539. Doi: 10.1080/13504622.2012.709824

Wright, W., Friese, B., Carrel, A., & Meinen, A. (2013). Creating a Sustainable Model for Establishing Youth Gardens in Schools and Childcare Centers. *Journal of Child Nutrition & Management*, *37*(2), n2. Retrieved from https://schoolnutrition.org/5--News-and-Publications/4--The-Journal-of-Child-Nutrition-and-Management/Fall-2013/Volume-37,-Issue-2,-Fall-2013---Wright,-Friese,-Carrel,-Meinen/

Yale University. (2017). *Yale Sustainable Food Program.* Retrieved from http://sustainablefood.yale.edu/

Appendix A

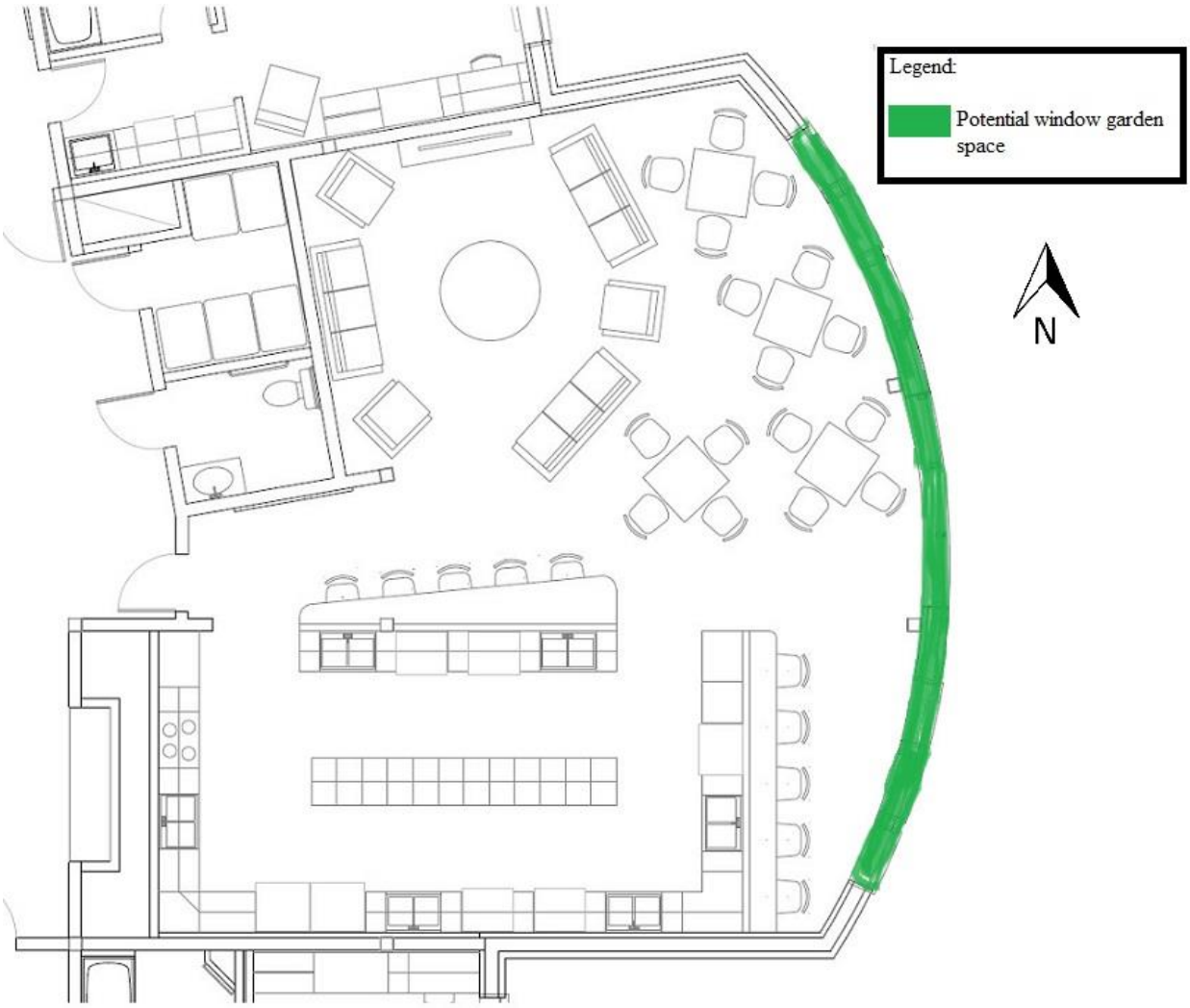
Potential Vegetable Growing Area on Grenfell Campus



Forestry Center Third Floor

Green area represents gardens already in place. These gardens currently hold decorative plants.

Appendix B
Potential Growing Areas in Grenfell Residence



Grenfell Campus Residence Complex Lounge

Appendix C
Guiding Questions for Interview with Henry Mann

1. What are optimal crops for indoor growing?
2. What resources would be needed for indoor growing?
3. Would hydroponics be a feasible option for the campus?
4. If no to 3, what is the next best option (perhaps container window gardens)?
5. What are the best crops to grow in this region of Newfoundland?
6. Could container gardening work/be productive for outdoors (rather than the labour intensive conventional gardens)?
7. How were you involved in growing plants/crops within the university (academic/no-academic)?

Appendix D
Survey Questions for Grenfell Campus

1. Are you
   a) A student living on campus
   b) A student living off campus
   c) Staff/faculty
   d) Administration
   e) A visitor

2. What is most important to you when buying produce? (Please choose one)
   a) Affordability
   b) Freshness
   c) Local
   d) Organic
   e) Other (specify)

3. Are you aware that there is are community garden plots dedicated to growing vegetables located on campus?
   a) Yes
   b) No

4. Would you like to see more vegetables grown on campus?
   a) Yes – both indoors and outdoors
   b) Yes – outdoors only
   c) Yes – indoors only
   d) No
   e) Indifferent

5. Would you want to get involved with growing vegetables on campus?
   a) Yes
   b) No

6. How much time per week would you contribute to helping out with a garden?
   a) 30 minutes
   b) 1 hour
   c) 2 hours
   d) Take all my free time!
   e) None, I do not have time

7. What benefits can you see coming from vegetable gardens on campus grounds/ window gardens around the school? (list at least 3)

8. What disadvantages do you see from these gardens? (list at least 3)

Appendix E

Survey Questions for Corner Brook Community

1. Are you a Corner Brook resident?
    a) Yes
    b) No
    c) Optional: Where are you from?

2. Are you
    a) A home owner?
    b) A renter?

3. Which age category applies to you?
    a) Under 20
    b) 20-34
    c) 35-54
    d) 55-70
    e) 71-80
    f) Over 80

4. Are there children under 12 living in your household?
    a) Yes
    b) No

5. What is most important to you when buying produce? (Please choose one)
    a) Affordability
    b) Freshness
    c) Local
    d) Organic
    e) Other (specify)

6. Do you have space in your backyard to support a vegetable garden? (relatively flat, sunny)
    a) Yes
    b) No
    c) Don't know if I have enough space
    d) I have space but don't know if the vegetables would survive

7. What are the approximate dimensions of your yard? (If you don't know, please answer "unknown")

8. Would you be interested in participating in a land-share program (Described above)?
    a) Yes
    b) No

9. How much of your yard would you dedicate to growing vegetables?
    a) One or two 2'x3' tub (no ground disturbance required)
    b) A small portion
    c) Half the yard
    d) Who needs grass? Let's transform the whole thing!